

REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

Claims 1-15 are presently pending in the above-identified application. As discussed in more detail below, claims 1-15 are amended, and new claim 16 is added. Accordingly, upon entry of this amendment, claims 1-16 will be pending. No new matter has been added.

Specification:

The Examiner objected to the form of the specification for not containing an abstract. Applicant has added an abstract.

Rejection of Claim 1, 7 and 8 under 35 U.S.C. § 102(b)

The Examiner rejected claims 1, 7 and 8 for being anticipated by GB Application No. 2276392 by Wilde et al. ("Wilde"). Specifically with respect to claim 1, the Examiner states:

Wilde discloses a process for extracting oil from a substance by contacting the substance with a solvent comprising HFC 134a (1, 1, 1, 2-tetrafluoroethane) in a sealed first vessel which is then heated. A solution of oil and HFC 134a from the first vessel is then passed into an evaporator (a second vessel) wherein the solution is then cooled to separate oil from the solution. (See example A on pages 13-15 and claim 6). This is deemed to anticipate the limitation of claim 1.

Applicant respectfully traverses this rejection for the following reasons. The process of extracting oil from a substance as disclosed in Wilde requires means to evaporate the solvent to recover the oil formerly extracted into a solvent. The evaporation process takes place in a separate vessel (evaporator) which is subject to vacuum. As a result, the solvent is turned into gas phase and withdrawn from the evaporator. Inevitably, the temperature of the evaporator cools down substantially due to the evaporation. As it is well known to one skilled in the art, solvent conversion to gas phase slows down with decreasing temperature. In order to maintain

operable temperature at which solvent can be efficiently removed, the evaporator is kept in a water bath to ensure that the temperature does not drop below 10°C. Indeed, in the passage to which the Examiner refers, it is clear that, during the evaporation process, the second vessel is actually **heated** to prevent the temperature from falling below the solvent's boiling point, hence slowing down the evaporation process. This process is fundamentally different from the process disclosed in the present invention. According to the present invention, the oil that has been formerly extracted into a solvent is recovered by actively **cooling** the oil-solvent mixture to allow for the precipitation of the oil (*see* steps (d) and (e) of claim 1). In fact, one of the advantages of the instant invention is the elimination of the costly evaporation process that is conventional in this field. Accordingly, the present invention differs from Wilde in at least one crucial step and therefore cannot be anticipated by Wilde.

With respect to claim 7, the Examiner states:

Wilde discloses that the second vessel (evaporator) is cooled to very low temperature and it is desirable to immerse the second vessel in a water bath furnished with an immersion heater and thermostat. The thermostat is set to activate the immersion heater when the water temperature fell to 10°C and to switch off the heater whenever the temperature of water exceeded 12°C. This is deemed to anticipate the limitation of claim 7. (See page 14; lines 21-26)

Applicant respectfully traverses this rejection for the following reason. As discussed above, the evaporator in Wilde necessarily **cools** during the evaporation of the solvent. It is therefore necessary to **heat** the evaporator to certain temperature range (10-12°C) to ensure efficient evaporation. (It is noted that the upper limit of the temperature range, i.e., 12°C, is apparently required to prevent the evaporation loss or decomposition of the extracted oil at higher temperature). In contrast, the present invention is directed to a process that first extracts the oil into a solvent (*see* step (a) of claim 1). During the extraction, the temperature is elevated to increase the solubility of the oil in the solvent (*see* step (b) of claim 1). The process of the present invention further calls for an active **cooling** step (step (d)), in which the oil precipitates and becomes separate from the solvent phase. Accordingly, Applicants respectfully submits that in the instant invention, the oil is obtained by precipitation through cooling as opposed to

heating. Thus, the instant invention cannot be anticipated by Wilde's invention which recovers oil through a heating process during which the solvent is evaporated under vacuum.

With respect to claim 8, the Examiner contends that it is anticipated by claim 7 of Wilde, which recites that seeds are among the natural products from which the oil may be extracted and recovered by an evaporation process. Applicant respectfully traverses. Claim 8 of the present invention contains further limitation of claim 1. Specifically, claim 8 recites the types of substances, such as seed from which the oil can be extracted and recovered by a precipitation process. Since claim 1 has been shown to not be anticipated by the teachings of Wilde, Applicant respectfully submits that the dependent claim 8 is also not anticipated by Wilde as it merely further limits claim 1.

Rejection of Claims 1-15 under 35 U.S.C. § 103 (c)

The Examiner rejected claim 6 for being obvious over Wilde. Specifically, the Examiner states:

Wilde does not specifically disclose that the first vessel is heated to a temperature of from 40 to 60°C. However, Wilde teaches that in order to improve the recovery of solvent, it is necessary to introduce heat to the extractor and its contents (see the last paragraph on page 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Wilde by heating the first vessel at the claimed temperature because one of skill in the art would employ any temperature (including the claimed pressure) that would enhance the recovery of solvent in the second vessel and it would be expected that the results would be the same or similar when operating the first vessel at either 39°C or 40°C.

Applicant respectfully traverses this rejection for the following reasons. Claim 6 of the present invention is a dependent claim of claims 1-5 with further limitation reciting the temperature range for step (b) of claim 1. As discussed above, claim 1 of the present invention differs fundamentally from the invention of Wilde in that the present invention requires an active cooling process to allow for the extracted oil to precipitate, i.e., step (d) of claim 1. This step is not obvious or suggested in any manner by Wilde. Indeed, because the oil is recovered by evaporation of the solvent in Wilde, active cooling of the solution in Wilde is expressly avoided.

Accordingly, Applicant respectfully submits that since claim 1 is not obvious over the teachings of Wilde, neither is claim 6, which is dependent upon claim 1.

The Examiner rejected claims 1-15 for being obvious over PCT Application No. WO 95/26794 by Powell et al. ("Powell") in view of Wilde. Specifically with respect to claims 1 and 11, the Examiner states:

Powell does not specifically disclose a step of heating the first vessel by a heating means and a step of cooling the second vessel. However, Wilde discloses a process of extracting oil from a substance wherein the first vessel is heated and the second is cooled to release oil from solution (see Wilde: the third and fourth paragraphs in page 14 and the last paragraph in page 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell to heat the first vessel by a heating means and to cool the second vessel as claimed because heating the first vessel would improve the recovery of solvent and cooling the second vessel would enhance the separation of solvent from the extracted oil.

Applicant respectfully traverses this rejection for the following reasons. Both Powell and Wilde teach the recovery of extracted components by means of evaporation of the solvent (*see, e.g., p. 7-8 in Powell*). Neither reference suggests or discloses a means by which one of an ordinary skilled in the art would be motivated to utilize a cooling step in the process simply because cooling would have been counter-productive to the process of evaporation disclosed therein, as it is well known in the art that solvent evaporation slows down at lower temperature. In contrast, the present invention stresses the use of a cooling step by which the oil is recovered by precipitation and becomes separated from the solvent. Hence, the present invention **avoids** the costly evaporative process (*see, e.g., p. 17 of the present invention*). Accordingly, Applicants respectfully submits that the deficiency of Powell is deficient in rendering the present invention obvious is not compensated by the disclosure of Wilde, because neither reference suggests or teaches the cooling step of the instant invention for precipitating the oil.

With respect to claims 2-5, the Examiner states:

The co-solvent is dimethyl ether (DME). Since the co-solvent of Powell is the same the claimed co-solvent, it is inherent that the co-solvent of Powell is liquid at room temperature. (See examples 1-2)

Applicant respectfully traverses this rejection for the following reasons. As discussed above, claim 1 of the present invention is not rendered obvious by Powell and/or Wilde. Claims 2-5 are dependent upon claim 1 and are directed to the specific types of the co-solvents as recited in step (a) of claim 1. Accordingly, Applicants respectfully submits that for the same reasons that claim 1 is not obvious in view of the teachings of Powell and/or Wilde, claims 2-5 are also not rendered obvious by the same teaching.

With respect to claims 6, the Examiner states:

Both Powell and Wilde do not disclose that the first vessel is heated to a temperature of from 40 to 60°C. However, Wilde teaches that in order to improve the recovery of solvent, it is necessary to introduce heat to the extractor and its contents (see the last paragraph in page 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell/Wilde by heating the first vessel at the claimed temperatures because one of skill in the art would heat the first vessel at any temperature (including the claimed temperature) to enhance the recovery of solvent in the second vessel and it would be expected that the results would be the same or similar when heating the first vessel either at 39°C or 40°C.

Applicant respectfully traverses the rejection for the following reasons. Claim 6 of the present invention is dependent upon claims 1-5 and further limits the invention by specifying a temperature range within which the extraction process can be carried out. As discussed above, because claims 1-5 are not rendered obvious by the teachings of Powell and/or Wilde, Applicant respectfully submits that claim 6 is also not rendered obvious by the same teachings.

With respect to claim 7, the Examiner states:

Powell does not disclose that the second vessel is cooled to a temperature of from -10°C to 25°C. However, Powell discloses that the distillation (evaporation) is carried out at a relative low temperature and the evaporation of the extraction solvent is aided by immersing the lower half of the evaporation chamber in an ambient temperature (which is about 20-24°C) water bath. The examiners position is that the second vessel (evaporator) is cooled to a temperature within the claimed ranges. (See page 7, lines 2-11; page 9, lines 3-6)

Applicant respectfully traverses the rejection for the following reasons. The distillation process disclosed in Powell is carried out at relatively low temperature because the solvents used therein are generally solvents of low boiling points (see, e.g., Powell, p. 6, line 34). The process still requires *heating* in the sense that if the oil-solvent system is not maintained at a certain temperature, evaporation of the solvent will significantly lower the temperature and reduces the speed of any further evaporation. As the Examiner has correctly pointed out, the evaporation chamber in Powell has to be immersed in a water bath to maintain such a temperature range. In contrast, the temperature range recited in claim 7 of the present invention is one for *cooling* the oil-solvent system, during which the oil will precipitate and thus becomes separate from the solvent. Accordingly, Applicant respectfully submits that claim 7 is not rendered obvious by the teachings of Powell because there is no suggestion or disclosure in Powell that would motivate one skilled in the art to recover the oil by cooling.

With respect to claim 8, the Examiner contends that it is rendered obvious by the teachings of Powell. As discussed above, Powell does not render the present invention obvious because the present invention is directed to a process of oil-recovery by cooling and precipitation. This process is not suggested or disclosed by Powell which teaches an oil-extraction/recovery process that involves distillation of the solvent by heating.

With respect to claim 9, the Examiner states:

The process of Powell including an apparatus system is as discussed above. Powell further discloses that the two vessels are connected by pipe work wherein the solution from the first vessel, which comprises a filtering means, is passed to the second vessel which is associated with a cooling means. Both vessels have an inlet and an outlet wherein the first vessel and second vessel are associated with each other by a valve. (See pages 7-10)

Powell does not specifically disclose that the second vessel has its own closable valves. However, it appears that both inlet and outlet of the second vessel should be closed when the transferring of liquid or substance in or out of the vessel is completed (see pages 7 and 8). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell/Wilde by employing at least one closable valve for the second vessel as claimed because a closable valve is a device that have both function for either opening or closing when it is needed.

Applicant respectfully traverses the rejection for the following reasons. As discussed above, the distillation process disclosed in Powell requires the presence of a *heating* means in association with the second vessel. The second vessel is not actively *cooled*, as interpreted by the Examiner, but rather actively *warmed* to enhance the evaporation of the solvent. In contrast, the second vessel in the present invention is in association with a *cooling* means which allows for the precipitation of the oil, hence avoids the evaporation process. This feature of the apparatus is not suggested in Powell, because it would have been counter-productive to the purpose of distilling the solvent. Accordingly, Applicant respectfully submits that the apparatus of claim 9 is not rendered obvious by Powell.

With respect to claim 10, the Examiner states:

Powell does not disclose that the valves are a one way valve which arranged as claimed. However, The flowing of the solvent and the solvent/oil solution within the process of Powell is a one way flow (See pages 7-9). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell/Wilde by utilizing one-way valves and arrange them in the modified process as claimed because it would be effective to use one way valves in the one-way process of Powell.

Applicant respectfully traverses the rejection for the following reasons. Claim 10 is dependent upon claim 1, which, as discussed above, differs fundamentally from the apparatus disclosed in Powell. The crucial difference lies in that the apparatus of the present invention comprises a second vessel which is in association with a *cooling* means, whereas the apparatus disclosed in Powell is necessarily in association with a *heating* means. Claim 10 merely further limits claim 1 by reciting the specifics of the valves. However, the essential components of the present invention are still within the scope of claim 10, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claim 10 is not rendered obvious by Powell, either alone or in combination with Wilde.

With respect to claims 12-13, the Examiner contends that the features recited are rendered obvious by Powell. As discussed above, the present invention differs fundamentally from the apparatus disclosed in Powell. Claims 12 and 13 merely further limits claim 1 by specifying how the solvent is introduced during the extraction and subsequently removed after

the oil precipitation. However, the essential components of the present invention are still within the scope of claims 12-13, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claims 12-13 are not rendered obvious by Powell, either alone or in combination with Wilde.

With respect to claim 14, the Examiner states:

Powell does not disclose that the apparatus includes means for determining the temperature of the first and second vessels. However, Powell discloses that it is important to operate the second vessel at room temperature or lower (see page 7, lines 2-11) and the first vessel of the modified process of Powell comprises a heating means. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Powell/Wilde by employing a means for determining the temperature of the first and second vessels because it is critical to regulate the temperatures of the first and second vessels at predetermined temperatures.

Applicant respectfully traverses the rejection for the following reasons. Claim 14 is dependent upon claim 1, which, as discussed above, differs fundamentally from the apparatus disclosed in Powell. The crucial difference lies in that the apparatus of the present invention comprises a second vessel which is in association with a *cooling* means, whereas the apparatus disclosed in Powell is necessarily in association with a *heating* means. Claim 14 merely further limits claim 1 by reciting means of regulating the pressure and temperature of the apparatus in order to optimize the extraction and precipitation processes. However, the essential components of the present invention are still within the scope of claim 14, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claim 14 is not rendered obvious by Powell, either alone or in combination with Wilde.

With respect to claim 15, the Examiner states:

The first and second vessels of Powell are transparent pressure vessels because Powell discloses that the solvent liquid containing the extract is transferred from the extraction apparatus to the evaporation chamber by depressing the valve which is forced the solvent liquid transfer into the evaporation chamber (see the last paragraph on page 8). Powell does not disclose that the vessels capable of withstanding pressures of not more than 25 bar. However, both of the vessels of Powell would operate under a certain

pressure (it appears that the pressure would be around 1 bar). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell by employ vessels capable of withstanding pressure of not more than 25 bar (e.g., 5 or 10 bar) because such vessels would effective to hold their contents during the process.

Applicant respectfully traverses the rejection for the following reasons. Claim 15 is dependent upon claim 1, which, as discussed above, differs fundamentally from the apparatus disclosed in Powell. The crucial difference lies in that the apparatus of the present invention comprises a second vessel which is in association with a *cooling* means, whereas the apparatus disclosed in Powell is necessarily in association with a *heating* means. Claim 15 merely further limits claim 1 by reciting the capability of the apparatus to withstand certain pressure. However, the essential components of the present invention are still within the scope of claim 15, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claim 15 is not rendered obvious by Powell, either alone or in combination with Wilde.

In conclusion, Applicant respectfully submits that the teachings of Wilde and Powell, either alone or taken together, do not render the instant invention obvious. In particular, neither references discloses or suggests that use of an active cooling step in the process of obtaining the desired product.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

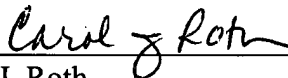
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A good faith effort has been made to place this application in condition for allowance. However, should any additional issue require attention prior to allowance, the Examiner is requested to contact the undersigned at (206) 622-4900 to resolve the matter.

Respectfully submitted,
SEED Intellectual Property Law Group PLLC



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Abstract

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